



Utah Geological Survey
a division of
Utah Department of Natural Resources

MEMORANDUM

TO: Leslie Heppler, Paul Baker
FROM: Andrew Rupke
DATE: November 5, 2014
SUBJECT: Quarry inspection at Five Mile Pass

At the request of the Utah Division of Oil, Gas, and Mining (DOGM), I visited a quarry at Five Mile Pass in Tooele County accompanied by Leslie Heppler (DOGM) and Paul Baker (DOGM) on November 3, 2014, to give an opinion on whether the quarry should be classified as a "mining operation" as per Utah Administrative Code R647. The quarry is operated by Metro Ready Mix (Metro), and we met with representatives from the company including John Dunn and their consultant Steve Zabriskie. The quarry is located in sections 4 and 5, T. 7 S., R. 3 W. (SLBLM). I used a GPS to establish a roughly central UTM coordinate for the quarry at 398403 m E, 4455426 m N (Z12 NAD83). Photos 1 and 2 show an overall view of the quarry and processing equipment. The quarry area is on the west side of the operations and four settling ponds are on the east side with processing facilities between the quarry and ponds.

Geologic mapping by Clark and others (2012) indicates that the quarry is in Quaternary alluvial fan deposits (Qafo, Qafy) (Map 1). Clark and others (2012) described the alluvial fan deposits as poorly sorted gravel, sand, silt, and clay. Alluvial fan material was generally deposited by streams, debris flows, and flash floods. Nearby, Clark and others (2012) also mapped exposures of the upper limestone and shale member of the Mississippian Great Blue Limestone (Mgbus) (Map 1). Clark and others (2012) described this unit as medium-bedded limestone and greenish-black shale with chert and quartzite lenses. The shale from this unit is locally mined for brick clay.

My inspection confirmed that Metro is quarrying material from unconsolidated alluvial fans in the area. Fresh exposures of the alluvial-fan material showed interbedded gravel-rich zones and buff-colored, silt-rich (?) fines zones in the quarry area (photos 3, 4, 5, and 6). Most of the fresh exposures and test pits we observed suggested that gravel zones are predominant over fine zones. No bedrock exposures were observed in Metro's current or planned quarry area. During the visit, Steve Zabriskie provided us with 13 sieve analyses from the alluvial fan material in the quarry area (see attachments). These results showed material passing the #200 sieve ranges from 8.9 to 47.5% and averaging 20.1%.

Based on sieve results and my observations, most of the material being quarried by Metro would fall under the definition of sand, gravel, and rock aggregate as per Utah Administrative Code R647. Extraction of sand, gravel, and rock aggregate is exempt from the definition of "mining operation." As per R647, sand and gravel deposits include unconsolidated sedimentary

deposits with the dominant grain size ranging from 1/16 mm to 10 mm, and rock aggregate includes clasts larger than 10 mm. So based on these definitions, an unconsolidated sedimentary deposit would need to be composed primarily of material less than 1/16 mm (0.063 mm), which is finer than the #200 sieve (0.075 mm), to be a potential candidate for a "mining operation." Also, Metro's intent is to process out the fines rather than extract them.

Mississippian Great Blue Limestone bedrock is exposed nearby to the east and south. In a couple of areas, it appeared that excavations for the settling ponds may have scraped down to bedrock. However, I observed no bedrock in the current or planned quarry areas.

Because Metro is not quarrying bedrock and is extracting unconsolidated sediments that would be primarily classified as sand, gravel, or rock aggregate, I conclude that their operation does not constitute a "mining operation" as per Utah Administrative Code R647. However, if operations were to proceed into nearby Mississippian bedrock, their operation would be classified as a "mining operation."

Reference

Clark, D.L., Kirby, S.M., and Oviatt, C.G., 2012, Interim geologic map of the Rush Valley 30' x 60' quadrangle, Tooele, Utah, and Salt Lake Counties, Utah: Utah Geological Survey Open-File Report 593, scale 1:100,000.



Photo 1. Metso quarry. View is to the west.



Photo 2. Processing facilities and settling pond. View is to the south.



Photo 3. Fines zone overlain by a gravel-rich zone in a fresh exposure of the alluvial-fan material within the quarry area. Field notebook is 0.62 ft long.



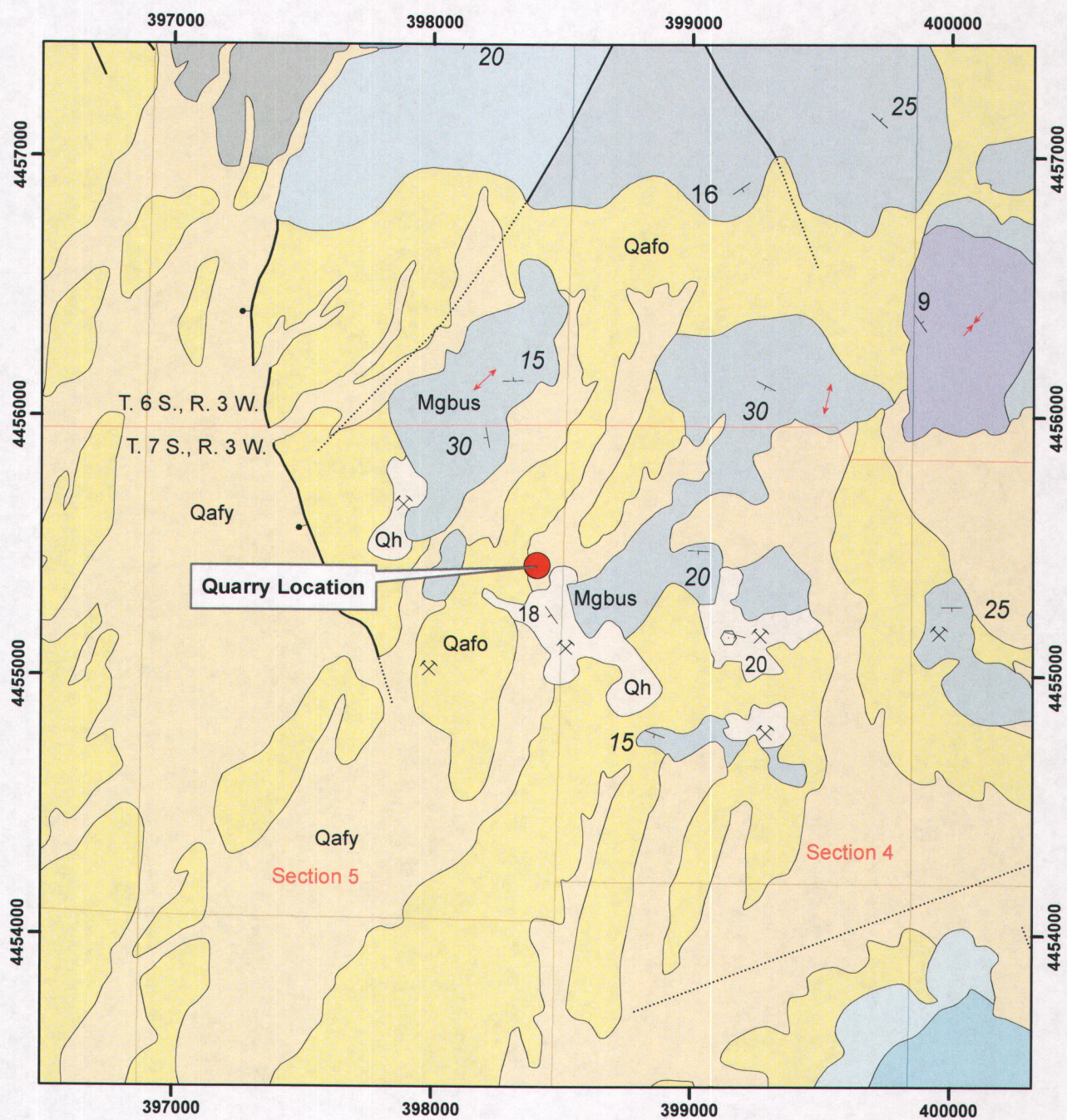
Photo 4. Gravel-rich zone in the quarry area. Field notebook is 0.62 ft long.



Photo 5. Gravel-rich zone overlain by a fines zone in the alluvial-fan material exposed in the quarry area. Field notebook is 0.62 ft long.



Photo 6. Test excavation exposing primarily gravel-rich alluvial-fan material.



Map 1. Geology of Five Mile Pass area from Clark and others (2012). Geologic symbols are as follows: Alluvial fan deposits - Qafy, Qafo; Human disturbance - Qh; Mississippian Great Blue Limestone, upper limestone and shale member - Mgbus.

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MR100
METRO READY MIX
343 W 400 S
SALT LAKE CITY UT 84101

June 26, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430020
MATERIAL: SAND AND GRAVEL
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/24/14
IDENTIFICATION: SAMPLE #1
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1"	0.0	0.0	0.0	100	
3/4"	165.9	1.3	1.3	99	
1/2"	1681.2	13.7	15.0	85	
3/8"	1274.9	10.4	25.4	75	
#4	2258.0	18.3	43.7	56	
-#4	6926.8	56.3			
TOTAL:	12306.8				
#8	121.6	16.5	16.5	47	
#16	60.2	8.1	24.6	42	
#30	35.4	4.8	29.4	40	
#50	35.3	4.8	34.2	37	
#100	189.0	25.6	59.7	23	
#200	180.6	24.4	84.2	8.9	

FINE GRADING ONLY:

ORIGINAL WT.	739.1	L.L.	0.0
WASHED WT.	648.9	P.L.	0.0
-#200 W.O.	90.2	P.I.	0.0
-#200 S.O.	26.8	CLASS:	
TOTAL -#200/75	117.0 = 15.8%		

Doug Watson

Manager

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June 26, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430023
MATERIAL: SAND AND GRAVEL
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/24/14
IDENTIFICATION: SAMPLE #2
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1"	0.0	0.0	0.0	100	
3/4"	33.5	0.3	0.3	100	
1/2"	1195.7	11.3	11.6	88	
3/8"	795.5	7.5	19.2	81	
#4	1403.9	13.3	32.5	68	
-#4	7125.6	67.5			
TOTAL:	10554.2				
#8	56.3	8.4	8.4	62	
#16	27.7	4.1	12.6	59	
#30	17.4	2.6	15.2	57	
#50	24.9	3.7	18.9	55	
#100	193.8	29.0	47.8	35	
#200	215.8	32.2	80.1	13.4	

FINE GRADING ONLY:

ORIGINAL WT.	669.3	L.L.	0.0
WASHED WT.	575.8	P.L.	0.0
-#200 W.O.	93.5	P.I.	0.0
-#200 S.O.	40.3	CLASS:	
TOTAL -#200/75	133.8 = 20.0%		

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June 26, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430022
MATERIAL: SAND AND GRAVEL
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/24/14
IDENTIFICATION: SAMPLE #3
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1"	0.0	0.0	0.0	100	
3/4"	145.3	1.6	1.6	98	
1/2"	1117.8	12.1	13.6	86	
3/8"	722.6	7.8	21.4	79	
#4	1498.1	16.2	37.6	62	
-#4	5775.9	62.4			
TOTAL:	9259.7				
#8	98.6	14.4	14.4	53	
#16	64.4	9.4	23.9	47	
#30	45.7	6.7	30.6	43	
#50	44.6	6.5	37.1	39	
#100	66.9	9.8	46.9	33	
#200	144.1	21.1	68.0	20.0	

FINE GRADING ONLY:

ORIGINAL WT.	683.0	L.L.	0.0
WASHED WT.	530.4	P.L.	0.0
-#200 W.O.	152.6	P.I.	0.0
-#200 S.O.	66.4	CLASS:	
TOTAL -#200/75	219.0 = 32.1%		

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June 26, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430021
MATERIAL: SAND AND GRAVEL
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/24/14
IDENTIFICATION: SAMPLE #4
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1"	0.0	0.0	0.0	100	
3/4"	95.7	1.0	1.0	99	
1/2"	1007.1	10.3	11.3	89	
3/8"	817.7	8.4	19.7	80	
#4	1913.1	19.7	39.4	61	
-#4	5901.7	60.6			
TOTAL:	9735.3				
#8	111.8	16.9	16.9	50	
#16	65.8	9.9	26.8	44	
#30	45.9	6.9	33.8	40	
#50	35.8	5.4	39.2	37	
#100	48.2	7.3	46.5	32	
#200	161.8	24.4	70.9	17.6	

FINE GRADING ONLY:

ORIGINAL WT.	662.0	L.L.	0.0
WASHED WT.	510.0	P.L.	0.0
-#200 W.O.	152.0	P.I.	0.0
-#200 S.O.	40.3	CLASS:	
TOTAL -#200/75	192.3 = 29.0%		

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June 27, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430394
MATERIAL: PIT TEST
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/25/14
IDENTIFICATION: SAMPLE A
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1"	0.0	0.0	0.0	100	
3/4"	200.9	2.2	2.2	98	
1/2"	1416.2	15.2	17.3	83	
3/8"	810.1	8.7	26.0	74	
#4	1737.3	18.6	44.6	55	
-#4	5178.0	55.4			
TOTAL:	9342.5				
#8	128.9	19.7	19.7	44	
#16	87.0	13.3	33.0	37	
#30	63.1	9.6	42.6	32	
#50	46.3	7.1	49.7	28	
#100	43.8	6.7	56.4	24	
#200	60.9	9.3	65.7	19.0	

FINE GRADING ONLY:

ORIGINAL WT.	654.3	L.L.	0.0
WASHED WT.	449.4	P.L.	0.0
-#200 W.O.	204.9	P.I.	0.0
-#200 S.O.	19.0	CLASS:	
TOTAL -#200/75	223.9 = 34.2%		

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June 27, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 430395
MATERIAL: PIT TEST
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/25/14
IDENTIFICATION: SAMPLE B
SPECIFICATION: SAMPLE BY: RYAN RUN BY: AC
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1.5"	0.0	0.0	0.0	100	
1"	42.9	0.4	0.4	100	
3/4"	185.1	1.9	2.3	98	
1/2"	1409.6	14.5	16.8	83	
3/8"	950.5	9.8	26.6	73	
#4	1727.6	17.8	44.4	56	
-#4	5411.6	55.6			
TOTAL:	9727.3				
#8	95.6	14.7	14.7	47	
#16	46.2	7.1	21.7	44	
#30	32.3	5.0	26.7	41	
#50	41.3	6.3	33.0	37	
#100	77.8	11.9	44.9	31	
#200	191.3	29.3	74.3	14.3	

FINE GRADING ONLY:

ORIGINAL WT.	652.5	L.L.	0.0
WASHED WT.	533.0	P.L.	0.0
-#200 W.O.	119.5	P.I.	0.0
-#200 S.O.	48.5	CLASS:	
TOTAL -#200/75	168.0 = 25.7%		

Doug Watson

Manager

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June 6, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 427200
MATERIAL: BORING SAMPLE
PIT/PLANT: 5 MILE

=====

PROJECT:	2033 METRO QUALITY CONTROL SERVICES	TEST DATE:	06/06/14
IDENTIFICATION:	SAMPLE B1 @ 35'		
SPECIFICATION:	SAMPLE BY: CUST	RUN BY:	KA
REMARKS:			
ITEM:	:		

=====

SIEVE USA-METRIC	GRAMS RETAINED	% RETAINED	ACCUM. % RETAINED	% PASSING	SPECIFICATION % PASSING
1/2"	0.0	0.0	0.0	100	
3/8"	2.7	0.6	0.6	99	
#4	37.7	8.0	8.5	92	
#8	42.4	9.0	17.5	83	
#16	34.1	7.2	24.7	75	
#30	29.9	6.3	31.0	69	
#50	28.0	5.9	36.9	63	
#100	28.1	5.9	42.8	57	
#200	45.8	9.7	52.5	47.5	

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ORIGINAL WT.	473.6	F.M.	0.00
WASHED WT.	271.3		
-#200 W.O.	202.3	DESIGN F.M.	0.00
-#200 S.O.	22.3		
TOTAL -#200/75	224.6 = 47.4%		

Doug Watson

Manager

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SALT LAKE CITY UT 84101

June 6, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 427201
MATERIAL: BORING SAMPLE
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/06/14
IDENTIFICATION: SAMPLE B2 @ 20'
SPECIFICATION: SAMPLE BY: CUST RUN BY: KA
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
3/4"	0.0	0.0	0.0	100	
1/2"	11.6	1.0	1.0	99	
3/8"	54.3	4.4	5.4	95	
#4	228.2	18.7	24.1	76	
#8	135.0	11.1	35.1	65	
#16	77.5	6.3	41.5	59	
#30	70.4	5.8	47.3	53	
#50	66.0	5.4	52.7	47	
#100	87.3	7.2	59.8	40	
#200	162.1	13.3	73.1	26.9	

ORIGINAL WT.	1220.8	F.M.	0.00
WASHED WT.	937.7		
-#200 W.O.	283.1	DESIGN F.M.	0.00
-#200 S.O.	45.0		
TOTAL -#200/75	328.1 = 26.9%		

Doug Watson

Manager

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June 6, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 427203
MATERIAL: BORING SAMPLE
PIT/PLANT: 5 MILE

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 06/06/14
IDENTIFICATION: SAMPLE B2 @ 10'
SPECIFICATION: SAMPLE BY: CUST RUN BY: KA
REMARKS:
ITEM: :

SIEVE USA-METRIC	GRAMS RETAINED	% RETAINED	ACCUM. % RETAINED	% PASSING	SPECIFICATION % PASSING
3/4"	0.0	0.0	0.0	100	
1/2"	6.0	1.0	1.0	99	
3/8"	14.9	2.4	3.3	97	
#4	73.0	11.6	15.0	85	
#8	56.7	9.0	24.0	76	
#16	41.4	6.6	30.6	69	
#30	36.6	5.8	36.4	64	
#50	36.5	5.8	42.2	58	
#100	76.1	12.1	54.3	46	
#200	129.3	20.6	74.9	25.1	

ORIGINAL WT.	627.8	F.M.	0.00
WASHED WT.	498.0		
-#200 W.O.	129.8	DESIGN F.M.	0.00
-#200 S.O.	27.2		
TOTAL -#200/75	157.0 = 25.0%		

Doug Watson

Manager

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June 6, 2014
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 427202
MATERIAL: BORING SAMPLES
PIT/PLANT: 5 MILE

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PROJECT:	2033 METRO QUALITY CONTROL SERVICES	TEST DATE:	06/06/14
IDENTIFICATION:	SAMPLE B3 @ 10'		
SPECIFICATION:	SAMPLE BY: CUST	RUN BY:	KA
REMARKS:			
ITEM:	:		

=====

SIEVE USA-METRIC	GRAMS RETAINED	% RETAINED	ACCUM. % RETAINED	% PASSING	SPECIFICATION % PASSING
3/4"	0.0	0.0	0.0	100	
1/2"	19.8	2.0	2.0	98	
3/8"	24.2	2.5	4.5	96	
#4	215.6	22.3	26.8	73	
#8	184.8	19.1	45.9	54	
#16	135.5	14.0	59.9	40	
#30	96.6	10.0	69.9	30	
#50	73.8	7.6	77.5	23	
#100	46.2	4.8	82.3	18	
#200	35.2	3.6	86.0	14.0	

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ORIGINAL WT.	967.6	F.M.	0.00
WASHED WT.	848.9		
-#200 W.O.	118.7	DESIGN F.M.	0.00
-#200 S.O.	17.0		
TOTAL -#200/75	135.7 = 14.0%		

Doug Whitman

Manager

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April 24, 2013
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 366713
MATERIAL: SAMPLE #1
PIT/PLANT:

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 04/18/13
IDENTIFICATION: PIT INVESTIGATION
SPECIFICATION:
REMARKS: SAMPLE BY: CUST RUN BY: KA
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
2"	0.0	0.0	0.0	100	
1.5"	587.7	2.3	2.3	98	
1"	1000.3	4.0	6.3	94	
3/4"	1331.4	5.3	11.6	88	
1/2"	2895.6	11.5	23.2	77	
3/8"	2283.3	9.1	32.3	68	
#4	4102.0	16.4	48.6	51	
-#4	12886	51.4			
TOTAL:	25086.3				
#8	110.3	15.8	15.8	43	
#16	66.3	9.5	25.3	38	
#30	56.9	8.1	33.4	34	
#50	78.4	11.2	44.6	28	
#100	91.8	13.1	57.8	22	
#200	121.6	17.4	75.2	12.7	

FINE GRADING ONLY:

ORIGINAL WT.	698.8	L.L.	0.0
WASHED WT.	592.6	P.L.	0.0
-#200 W.O.	106.2	P.I.	0.0
-#200 S.O.	67.3	CLASS:	
TOTAL -#200/75	173.5 = 24.8%		

Doug Watson

Manager

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April 24, 2013
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 366714
MATERIAL: SAMPLE #2
PIT/PLANT:

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 04/18/13
IDENTIFICATION: PIT INVESTIGATION
SPECIFICATION: SAMPLE BY: CUST RUN BY: KA
REMARKS:
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
1.5"	0.0	0.0	0.0	100	
1"	640.2	3.7	3.7	96	
3/4"	651.9	3.7	7.4	93	
1/2"	620.3	3.6	11.0	89	
3/8"	1298.0	7.4	18.4	82	
#4	2990.9	17.2	35.6	64	
-#4	11224	64.4			
TOTAL:	17425.3				
#8	63.0	9.8	9.8	58	
#16	60.6	9.5	19.3	52	
#30	42.8	6.7	26.0	48	
#50	44.4	6.9	32.9	43	
#100	59.0	9.2	42.1	37	
#200	114.0	17.8	59.9	25.8	

FINE GRADING ONLY:

ORIGINAL WT.	640.5	L.L.	0.0
WASHED WT.	457.1	P.L.	0.0
-#200 W.O.	183.4	P.I.	0.0
-#200 S.O.	73.3	CLASS:	
TOTAL -#200/75	256.7 = 40.1%		

Doug Watson

Manager

CMT ENGINEERING LABORATORIES

Construction * Materials * Technologies
Geotechnical, Environmental, & Materials Engineering/Testing/Research

MR100
METRO READY MIX
343 W 400 S
SALT LAKE CITY UT 84101

April 24, 2013
Sieve Analysis
ASTM: C-136, C-117
AASHTO: T-27, T-11
LAB NO.: 366718
MATERIAL: SAMPLE #6
PIT/PLANT:

PROJECT: 2033 METRO QUALITY CONTROL SERVICES TEST DATE: 04/18/13
IDENTIFICATION: PIT INVESTIGATION
SPECIFICATION:
REMARKS: SAMPLE BY: CUST RUN BY: KA
ITEM: :

SIEVE	GRAMS	%	ACCUM. %	%	SPECIFICATION
USA-METRIC	RETAINED	RETAINED	RETAINED	PASSING	% PASSING
2"	0.0	0.0	0.0	100	
1.5"	107.4	0.7	0.7	99	
1"	559.0	3.8	4.5	96	
3/4"	413.0	2.8	7.4	93	
1/2"	1230.6	8.4	15.8	84	
3/8"	904.3	6.2	21.9	78	
#4	2465.7	16.8	38.8	61	
-#4	8977.6	61.2			
TOTAL:	14657.6				
#8	154.9	24.8	24.8	46	
#16	116.0	18.5	43.3	35	
#30	56.0	9.0	52.2	29	
#50	38.0	6.1	58.3	26	
#100	38.0	6.1	64.4	22	
#200	53.5	8.6	72.9	16.6	

FINE GRADING ONLY:

ORIGINAL WT.	625.7	L.L.	0.0
WASHED WT.	506.3	P.L.	0.0
-#200 W.O.	119.4	P.T.	0.0
-#200 S.O.	49.9	CLASS:	
TOTAL -#200/75	169.3 = 27.1%		

Doug Watson

Manager